What is claimed is:

1.   A color conversion apparatus for converting an input color signal to match a color gamut of the input color signal with a color gamut of a target Multi Primary Display (MPD) using at least four primary colors, the apparatus comprising:

a WYV color signal conversion unit for converting the input color signal into a WYV color signal for a first output;

a color gamut matching gain calculation unit for calculating a matching gain which is a conversion value for matching the color gamut of the input color signal with the color gamut of the target MPD;

a color gamut matching unit for converting the WYV color signal based on the matching gain;

an XYZ color signal conversion unit for converting the converted WYV color signal into an XYZ color signal for a second output; and

an MPD control vector calculation unit for calculating a control vector which is a driving signal of the target MPD corresponding to the XYZ color signal.

2.   The color conversion apparatus as claimed in claim 1, further comprising a linear correction unit for linearly correcting a non-linear standard RGB color signal into a standard RGB color signal and providing the corrected RGB color signal as the input color signal.

3.   The color conversion apparatus as claimed in claim 1, wherein the color gamut matching gain calculation unit decides a range of maximum chroma values while maintaining hue and luminance constant with reference to the color gamuts of the input color signal and target MPD, and calculates the matching gain based on ratios of the decided maximum chroma values.

4.   The color conversion apparatus as claimed in claim 3, wherein the color gamut matching gain calculation unit calculates the maximum chroma values from cross points of a surface equation representing the color gamut and linear equations satisfying conditions that maintain the hue and luminance constant.

5.   The color conversion apparatus as claimed in claim 1, wherein the color gamut matching gain calculation unit includes:

a 2D-LUT memory for tabulating and storing data corresponding to the matching gain;

an address conversion unit for converting the WYV color signal into a 2D-LUT address to access the 2D-LUT memory; and

an interpolation unit for outputting the matching gain calculated through interpolation of data outputted from the 2D-LUT memory.

6.   A color conversion method for converting an input color signal to match a color gamut of the input color signal with a color gamut of a target MPD using at least four primary colors, comprising:

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converting the input color signal into a WYV color signal for a first output;

calculating a matching gain which is a conversion value for matching the color gamut of the input color signal with the color gamut of the target MPD;

converting the WYV color signal based on the matching gain;

converting the converted WYV color signal into an XYZ color signal for a second output; and

calculating a control vector which is a driving signal of the target MPD corresponding to the XYZ color signal.

7.   The color conversion method as claimed in claim 6, further comprising linearly correcting a non-linear standard RGB color signal into a standard RGB color signal and providing the corrected RGB color signal as the input color signal.

8.   The color conversion method as claimed in claim 6, wherein the matching gain calculation step decides a range of maximum chroma values while maintaining hue and luminance constant with reference to the color gamuts of the input color signal and target MPD, and calculates the matching gain based on ratios of the decided maximum chroma values.

9.   The color conversion method as claimed in claim 8, wherein the matching gain calculation step calculates the maximum chroma values

from cross points of a surface equation representing the color gamut and linear equations satisfying conditions that maintain the hue and luminance constant.

10.   The color conversion method as claimed in claim 6, wherein the matching gain calculation step comprises:

tabulating and storing data corresponding to the matching gain;

converting the WYV color signal into a 2D-LUT address to access the stored data; and

outputting the data corresponding to the 2D-LUT address, interpolating the outputted data, and outputting the matching gain.